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On certain Variable Stars having the Appearance, visually, of Planetary Nebulæ. By Cuthbert E. Peek, M.A.

Having observed variable stars regularly for the last seven years, I wish to call attention to a letter published in *Knowledge* 1892 March 1, in which I refer to the fact that a considerable number have, at times, the appearance of planetary nebulæ as described by Herr E. von Gothard in the January number of the *Monthly Notices.* Without repeating the whole of the facts there given, I quote the following with regard to three stars:—

R. Cassiopeiæ, 1886 September 17, 8·7 mag.—A large, ill-defined, deep-red star. 1889 March 11, 9·6 mag. Very hazy and ill-defined, as if shining through ruddy mist. Other stars sharp.

T. Cassiopeiæ, 1889 September 10, 7·7 mag.—Very red. A well-defined star shining through a ruddy haze.

S. Herculis, 1891 October 14.—With power 132 a faint nebulosity is suspected in the place of the variable; on slightly swaying the telescope a bluish nebulosity is certainly seen. It will be remembered that *Nova Aurigæ* was first described in the *Times* of 1892 February 3 as 'slightly fuzzy.' Instrument in use 6¼-inch equatoreal refractor.

Rousdon Observatory:
1892 *January* 29.

Observations of Saturn in 1892. By M. Joseph Guillaume, of the Observatoire de Lyon.

(*Communicated by the Rev. A. Freeman.*)

The following is the translation of a letter received by Mr. Freeman from M. Guillaume, 1893 January 5.

"I must first of all tell you that I left my own observatory at Péronnas (near Bourg-en-Bresse) in September last for that of Lyons, where I am working under the direction of M. Ch. André.

"I have published nothing as yet upon *Saturn* in 1892, but I proceed to give you all that I could say about the planet, leaving it to you to communicate it to the Royal Astronomical Society in part or entirely as may appear best to you.

"A long course of bad weather at the beginning of the year hindered me from observing as much as I could have desired, especially in watching the transits of the satellites other than

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Titan, to which M. Terby has particularly drawn my attention. I have made only seventeen observations, which may be described thus:—

"The northern hemisphere continued to appear more dusky than the other. I noticed on it a broad bright band, which appeared striated on March 23. It was separated from a broader grey zone by a dusky narrow band sometimes stippled; and then, towards the north, another band of a deeper tint a little broader than the first band. These two bands were not always easy to limit internally. The polar cap has not always shown the same appearance; thus, when the details which I have mentioned were visible its aspect was less sombre; otherwise, although less deep in tint, there was never any sharp boundary between this region and the broad grey zone.

"On the south hemisphere the appearance was sensibly the same as in 1891. The equatorial band displayed brighter parts than the rest on March 11, and the rest of the hemisphere exhibited marblings; but on April 15, with a remarkably fine image, I saw the first dark band divided by a narrow bright line, very faint, and then two bright bands separated by a grey one of the same appearance as the polar cap.

"Apart from the variations of brightness remarked upon the two ansæ, there were few details to note upon the rings on account of their small opening. Sometimes the dark ring was perceived, and the Cassini division, always bordered externally by a bright zone similar to the ring *B*. On March 11 the ring *C* was visible, in front of the ball, at the same time with a narrow black line, which might be the shadow of the rings. *A* was grey at the ends of the ansæ. On March 31 the middle of *B* at the west was grey. Later, the ring closing up, I could only notice the difference of brightness, which I continued to register by schematic figures. On May 21, the last observation made, an interval between the ball and the ring appeared to a slight extent on the east. The western ansa [*eastern* is meant], after the opposition, appeared to me thinner against the ball than on the opposite side, which was evidently due to the shadow projected by the planet. On April 15 it even appeared separated from the ball with a magnifying power of 194, but with 298 there was no solution of continuity; the ring was only thinner.

"The shadow of the ring has sometimes been noticed oppositely curved relatively to the ring; it has exhibited variations of extent, produced by the differing inclinations of the Sun and the Earth to the plane of the rings.

"*The Satellites.*—I observed the shadow of *Titan* upon the ball on February 24; the satellite was dusky and greenish-yellow rather than orange-rose, as it appeared to me on 1891 December 23; it was very near the planet on the east; it must have passed in front very near the limb, but the clouds prevented me from following it. On March 11 an observation, short on account of the clouds, permitted me to see *Titan* and his shadow

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near each other; the satellite was a little more south than the shadow, and very dark, almost black. On April 28 the clouds prevented me from seeing the passage before the ball, but a little later *Titan* travelled a very short distance to the south of the ring. I regretted having been unable to follow the transit, because *Titan* must have passed along the shadow of the ring. *Titan* appeared to me bluish-green, and of brightness sensibly equal to that of the ring. On May 6, from $8^h\ 10^m$ to $8^h\ 20^m$ [Paris M.T.], *Titan* was not visible; if it did not travel just behind the ring, which the state of the telescopic image prevented me from seeing, it was occulted. On May 14 I at first noticed this satellite in front of the ring as a luminous spot; then, towards the end of its passage, the instant of separation from the ring was not easy to determine precisely. At the beginning of the observation I believed I saw an indentation on the south border of the east ansa, which might be the shadow of *Titan*, but the view was not perfect enough for me to be absolutely sure of this appearance, which was of short duration.

"I several times attempted to observe the passage of the other satellites. Unfortunately the atmospheric conditions always left much to be desired, and my efforts to observe anything have met with no success. On April 15 the view, however, was such *at instants* that I do not think it possible to have a better; yet, in spite of all my attention, I was not able to observe the transit of *Rhea*; and, at the moment, I concluded that the phenomena of this satellite, and, for the greater reason, of the smaller satellites, could not be observed except with an instrument more powerful than my excellent reflector of 216 millimetres diameter (8½ ins.), the mirror by With."

Observations of the Position-Angle of the Ring of Saturn.

By A. Stanley Williams.

The following measures of the position-angle of the major axis of the ring of *Saturn* were made with a 6½-inch reflector by Calver. The position micrometer is a small one by Troughton & Simms. The position circle, 2½ inches in diameter, is divided to 30′, and reads by a single vernier to 1′. The magnifying power used was 230. Prior to April 22 a single thin wire was employed, but, owing to the increasing narrowness of the ring, this became unsatisfactory, and the subsequent measures were made by separating the distance-webs to a distance of about 4″, and bringing the ring between them.